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EXAMINER

SHAW, SHAWNA JEANNINE

ART UNIT PAPER NUMBER

3737

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,725

Applicant(s)

EWING ET AL.

Examiner

Shawna J. Shaw

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: element 10 is not shown. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: It appears that Serial No. –10/609,259—is missing on page 1 of the specification. Appropriate correction is required.

Information Disclosure Statement

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the

list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 25-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The metes and bounds of "ultra high spatial resolution" cannot be clearly ascertained as "ultra high" appears to be a relative term and does not connote a specific structure.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 37 is rejected under 35 U.S.C. 102(b) as being anticipated by Hoenig.

Hoenig teaches supporting the head of a patient on a headrest mounted on a table, or cart, having an array of magnetic sensors forming part of an inverted SQUID dewar so as to detect electrical activity from the brain; and supporting the rest of the body on a bed mounted to the table, or cart (fig. 1).

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Regarding claims 2-4 and 25-28, the examiner requests applicant to provide information concerning average coronal and sagittal radii of curvature for both adults and infants in response to this office action. For examination purposes, the examiner understands that the human head has a radius of curvature of about 7-10 cm, or 70-100 mm, (as evidenced by 2004/0173221 paragraph [0054] and Choi et al. p. 223 section 3.3).
7. Claims 1-5, 9 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoenig in view of Jonsen.

Regarding claims 1-5, 9 and 21-24, Hoenig discloses a patient table comprising all of the claimed subject matter (including a headrest inherently having a radius of curvature in the claimed range) (see fig. 1) except that the table is not portable in the sense that it is not disclosed as being movable along the ground and is hooked up to a refrigerant pipeline (19) underneath (see fig. 2). Jonsen discloses a portable SQUID including a DC power source (16) and electronics (18) and refrigerant container (14) all enclosed within a portable, RF shielded box (12). See col. 2 lines 20-26 and claim 1. It would have been obvious at the time the invention was made to a person of ordinary skill in the art to replace the bulky, tethered SQUID of Hoenig with the self-contained, portable dc SQUID of Jonsen for self evident reasons and due to the nature of the problem being solved - wherein a patient having their head examined in an emergency situation (such as head trauma), and is unable to walk, needs to be as ambulatory as possible. It would have additionally been obvious to make the table movable because making an old object "portable" or "movable" is well established by the courts to have been obvious to one of ordinary skill in the art. See MPEP 2144.04 (V)(A).

8. Claims 1-9, 16, 17 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoenig in view of Dilorio et al.

Regarding claim 1, Hoenig discloses a patient table, or "cart," comprising all of the claimed subject matter (see fig. 1) except that the table is not portable in the sense that it is not disclosed as being movable along the ground and is hooked up to a refrigerant pipeline (19) underneath (see fig. 2). Dilorio et al. teaches a disconnectable (56) refrigerant supply line (72) enabling free movement of magnetic field pick-up coils

(col. 10 lines 5-8). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to replace the refrigerant pipeline of Hoenig with the flexible supply line of Dilorio et al. to provide easier access to, and connection/disconnection of, the supply line to a (e.g., backup) refrigerant source in the event of depletion or malfunction (Dilorio et al., col. 10 lines 8-14, see also Schnapper col. 7 lines 55-60). In addition, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to make the table and flexible supply line as taught by Hoenig in view of Dilorio et al. "portable" or "movable" as is well established by the courts (see MPEP 2144.04 (V)(A)) and due to the nature of the problem being solved (see paragraph 7 above).

Regarding claims 2-4, it is inherent that the universal head support of Hoenig falls within the claimed range. Alternatively, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to replace the sensor support of Hoenig with the conformable/adjustable sensor support (16) of Dilorio et al. so as to maintain close contact with persons of different sized heads (e.g., fig. 16, col. 14 lines 8-25) and thereby obtain higher resolution and improved signal-to-noise ratio (col. 9 lines 65-68).

Regarding claims 5 and 9, the head support of Hoenig inherently meets the claimed limitations.

Regarding claim 6, the support structure of Dilorio is composed of an insulating and structurally strong material such as fiberglass (functionally equivalent to G-10 fiberglass) as is commonly used (col. 5 line 65 – col. 6 line 17). It would have been

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obvious at the time the invention was made to a person of ordinary skill in the art to use a fiberglass support as taught by Dilorio et al. in the invention as taught by Hoenig as is well established in the art.

Regarding claims 7 and 8, Hoenig differs in that a spacing of 1-3 mm between the sensors and the outer head engaging portion of the headrest is not specifically addressed. Dilorio et al. disclose wherein the support structure has a series of hollowed-out portions (fig. 13) so that the coils are separated from the outer head engaging surface by only a thin polymeric material (240) such as mylar or cloth (col. 12 lines 11-15) (impliedly 1-3 mm). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to arrange the sensors of Hoenig as close to the support as possible as taught by Dilorio et al. so as to achieve higher resolution and improved signal to noise ratio (col. 9 lines 65-69).

Regarding claims 16 and 17, Hoenig differs in that a headrest having recesses in the rear surface thereof for the sensors is not specifically addressed. Dilorio et al. teaches a support structure having a series of recesses (i.e, holes or hollowed out portions) in a rear surface thereof for receiving the sensors (fig. 13, 15, 16). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to provide a corresponding receiving space in for the detectors (24) of Hoenig as taught by Dilorio et al. to provide isolation and stability for the sensors while allowing them to be placed as close to the patient as possible.

Regarding claim 38, Hoenig differs from the claimed invention in that the step of moving the sensors (24) relative to the headrest is not specifically addressed. Dilorio et

al. teaches a structure (16) for slidably holding sensors (12) adjacent to the head in an adjustable fashion (e.g., using spring bias) so as to maintain close contact with persons of different sized heads (fig. 16, col. 14 lines 8-25) and thereby obtain higher resolution and improved signal-to-noise ratio (col. 9 lines 65-68). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to provide spring-biased, movable sensors in the invention of Hoenig as taught by Dilorio et al. for the above described reasons.

9. Claims 10-15, 20 and 25-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoenig in view of Dilorio et al. and further in view of Yokosawa et al.

Regarding claims 10-15, Hoenig and Dilorio et al. differ from the claimed invention in that a pick-up coil having a small diameter and inter-coil spacing on the order of a few millimeters is not specifically addressed (even though Dilorio et al. discloses thin film pick-up coils disposed on a substrate fig. 8-10). Yokosawa et al. teach an integrated-type dc SQUID magnetometer having as many as 200 sensors disposed about the head (fig. 6, col. 5 lines 8-21). Although Yokosawa et al. does not explicitly set forth the coil diameters and spacing, it is implied that they are on the order of a few millimeters or less with the use of 200 sensors - since it is disclosed that the substrate itself is around 30 x 40mm (col. 3 lines 10-14) as well as by virtue of the surface area of the patient's head itself. It would have been obvious at the time the invention was made to a person of ordinary skill in the art to replace the sensor coils of Hoenig in view of Dilorio et al. with the even smaller and more compact integrated-type

SQUID magnetometer devices of Yokosawa et al. to form a lightweight, cost-effective, and densely aggregated magnetometer with improved spatial resolution.

Further regarding claim 20, Hoenig and Dilorio et al. differ from the claimed invention in that sensors arranged in groups of four are not addressed. Yokosawa et al. demonstrates an integrated-type dc SQUID magnetometer having sensing coils arranged in groups of four (see fig. 9 and col. 5 line 67 – col. 10 line 7). Dilorio et al. further demonstrate where it is known to subtract signals (223) to obtain different measurements (col. 11 lines 62-65). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to arrange the sensors of Hoenig in view of Dilorio in groups of four as taught by Yokosawa et al. to improve signal acquisition time and allow manipulation of adjacent signals as is well known in the art. Furthermore, at the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to use groups of four sensors since applicant has not disclosed that such a number of sensors provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art furthermore, would have expected Applicant's invention equally well with single or paired sensors as taught by Hoenig in view of Dilorio et al. since all are able to adequately obtain magnetoencephalography signals.

Regarding claims 25-28 and 33, Hoenig discloses a concave headrest for a magnetoencephalography system. Although Hoenig discloses that substantially more than three gradiometers may be used (col. 3 lines 59-63), Hoenig does not specifically address an array of "ultra high" resolution sensors. Dilorio et al. disclose a

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conformable/adjustable structure (16) supporting a plurality of sensors (12) and providing close contact with variably shaped/sized heads [taking on the radius of curvature of the head placed in it] so as to obtain high-resolution signals (col. 9 lines 65-69, col. 14 lines 13-25). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to use the conformable/adjustable sensor support with multiple sensors as taught by Dilorio et al. in the invention as taught by Hoenig so as to obtain as close contact as possible with the sensor coils thereby obtaining high resolution signals. It would have further been obvious at the time the invention was made to a person of ordinary skill in the art to replace the sensor coils of Hoenig in view of Dilorio et al. with the even smaller and more compact integrated-type SQUID magnetometer devices of Yokosawa et al. to form a lightweight, cost-effective, and densely aggregated magnetometer with "ultra" high spatial resolution.

Further regarding claims 29 and 30, the support structure of Dilorio is composed of an insulating and structurally strong material such as fiberglass (functionally equivalent to G-10 fiberglass) as is commonly used (col. 5 line 65 – col. 6 line 17). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to use a fiberglass support as taught by Dilorio et al. in the invention as taught by Hoenig as is well established in the art.

Regarding claims 31 and 32, Hoenig differs in that a spacing of 1-3 mm between the sensors and the outer head engaging portion of the headrest is not specifically addressed. Dilorio et al. disclose wherein the support structure has a series of hollowed-out portions (fig. 13) so that the coils are separated from the outer head

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engaging surface by only a thin polymeric material (240) such as mylar or cloth (col. 12 lines 11-15) (impliedly 1-3 mm). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to arrange the sensors of Hoenig as close to the support as possible as taught by Dilorio et al. so as to achieve higher resolution and improved signal to noise ratio (col. 9 lines 65-69).

Regarding claims 34-36, Hoenig and Dilorio et al. differ from the claimed invention in that a pick-up coil having a small diameter and inter-coil spacing on the order of a few millimeters is not specifically addressed (although Dilorio et al. discloses thin film pick-up coils disposed on a substrate fig. 8-10). Yokosawa et al. teach an integrated-type dc SQUID magnetometer having as many as 200 sensors disposed about the head (fig. 6, col. 5 lines 8-21). Although Yokosawa et al. does not explicitly set forth the coil diameters and spacing, it is implied that they are on the order of a few millimeters or less with the use of 200 sensors - since it is disclosed that the substrate itself is around 30 x 40mm (col. 3 lines 10-14) as well as by virtue of the surface area of the patient's head itself. It would have been obvious at the time the invention was made to a person of ordinary skill in the art to replace the sensor coils of Hoenig in view of Dilorio et al. with the smaller and more compact integrated-type SQUID magnetometer devices of Yokosawa et al. to form a more lightweight, cost-effective, and densely aggregated magnetometer with improved resolution.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoenig in view of Dilorio et al. and further in view of Zanakis et al.

Regarding claim 18, Hoenig and Dilorio et al. differ from the claimed invention in that a honeycomb configuration is not specifically addressed. In the same field of endeavor, Zanakis et al. demonstrates that such a configuration (17) is well known to shield, and reduce vibration between, sensors (col. 7 lines 28-43). It would have therefore been obvious at the time the invention was made to a person of ordinary skill in the art to arrange the sensors of Hoenig in view of Dilorio et al. in a honeycomb configuration as is well known in the art and for the above described reasons.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoenig in view of Dilorio et al. and further in view of Zanakis et al. in view of Yokosawa et al. as applied to claims 18 and 20 above.

Conclusion


12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ludeke et al. (5,475,306) demonstrates that it is well known to surround SQUID magnetometers with conductive RF shielding to reduce electronic interference from external sources with the operation of the highly sensitive sensors (see col. 1-2 and col. 5 lines 11-14)..

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawna J. Shaw whose telephone number is (571) 272-4743. The examiner can normally be reached on 6:45 a.m. - 3:15 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shawna J. Shaw
Primary Examiner
Art Unit: 3737
02/02/2005